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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,889	08/06/2001	Michael Nahum	106564	8834

25944 7590 11/16/2004

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
PATEL, SHEFALI D	
ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/921,889	NAHUM, MICHAEL	
	Examiner	Art Unit	
	Shefali D Patel	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32,35 and 36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *33* is/are allowed.

6)☒ Claim(s) *1-8,11,12,27-32,35 and 36* is/are rejected.

7)☐ Claim(s) *9,10,13-26 and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *05/20/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Claim 30 has been misnumbered as claim 30 recites the same language as claim 29. Notice, both claim 29 and 30 depend on claim 1.

2. Claim 34 is objected to because of the following informalities: Claim 34 depends from itself. Perhaps claim 34 ought to depend on claim 33. Appropriate correction is required.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim 36 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

A "carrier wave encoded to transmit" as disclosed in claim 36 line 1 is non-statutory subject matter under 101 because it is an abstract idea or because it does not fit within any of the statutory classes. A carrier wave per se, whether an abstract arrangement of information or a physical manifestation of information, does not produce a "useful, concrete and tangible result" until it is coupled with physical structure.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 8, 11-12, 27-28, 31-32 and 35are rejected under 35 U.S.C. 102(b) as being anticipated by Nakajima et al. (US 6,067,367) (hereinafter, "Nakajima").

With regard to claim 1 Nakajima discloses a method for determining a location of a peak of a correlation function generated by comparing a first high-spatial-frequency image to a second high-spatial- frequency image (comparing the collation image, G1 (col. 12 lines 21-25) and registration image, G2 (col. 12 lines 41-46) after synthesizing at col. 12 lines 62-65. See correlation of pixels at col. 13 lines 44-48), the correlation function having a regular background portion and a peak portion (the entire area including background and a peak portion disclosed at col. 13 lines 47-48), the method comprising: comparing a first high-spatial-frequency image to a second high- spatial-frequency image to determine at least one correlation function value for a set of at least one sparsely distributed correlation function value point of the correlation function (comparing two images G1 and G2 to obtain correlation function value at col. 13 lines 44-55, col. 16 lines 54 to col. 17 lines 1-4); and analyzing at least one of the at least one correlation function value to identify at least one correlation function value point that lies within the peak portion (analyzing the moving distance value of the vehicle by correlation. See, col. 13 lines 56-67, col. 17 lines 5-16).

With regard to claim 2 Nakajima discloses the method of claim 1, wherein analyzing the at least one of the at least one correlation function value (i.e., moving distance value) comprises comparing **at least one of** a) the at least one of the at least one correlation function value (comparing the value after synthesizing the image G1 and G2 as disclosed at col. 13 lines 44-55 and col. 16 lines 54-67) and b) a determined value based on at least two of the at least one correlation function value to at least one value characterizing the regular background portion of the correlation function.

With regard to claim 8 Nakajima discloses determining correlation function value dynamically as disclosed throughout the invention. Also see, col. 12 lines 3-65.

With regard to claim 11 Nakajima discloses dynamically determining the at least one value characterizing the regular background portion of the correlation function comprises: correlating a pair of images that are representative of the first and second high-spatial-frequency images to generate at least a representative portion of the regular background portion of the correlation function of that image (correlating two images and obtaining a portion of the background portion at col. 13 lines 44-64 and col. 17 lines 5-10); and determining, based on at least the representative portion of the regular background portion of that correlation function, the at least one value characterizing the regular background portion of the correlation function (based on the background portion, obtaining characterization value of the correlation function at col. 17 lines 51-62).

With regard to claim 12, Nakajima discloses the peak portion of the correlation function that has a width (notice, Nakajima at col. 13 lines 12-14, 21-24, 38-50, discloses suppressing the amplitude (i.e., width). In order to suppress the amplitude, there should exist one); and the

correlation function value points of the set of sparsely distributed correlation function value points are spaced apart by a distance that is less than the width of the peak portion of the correlation function (the distance of the correlation function value is seen in Figures 1E-1H and at col. 13 lines 56 to col. 14 lines 1-7).

With regard to claim 27 Nakajima discloses determining the location of the peak of the correlation function based on at least one correlation function value point that lies within the peak portion (determining the location by determining the coordinates of the correlation peak at col. 16 lines 67 to col. 17 lines 1-4.

With regard to claim 28 Nakajima discloses determining a position offset between the first and second images based on the determined location of the peak of the correlation function (See, col. 17 lines 1-16 and the offset disclosed in Figures 5E-5H).

With regard to claim 31 Nakajima discloses image correlation function as one-dimensional function (Figure 1E-1H and 5E-5H only x and y coordinates are disclosed).

With regard to claim 32 Nakajima discloses image correlation function as two-dimensional function (Figure 23F-23J Nakajima further discloses one more dimension which is depth, see, col. 29 lines 23-32).

Claim 35 recites identical features as claim 1 except claim 35 is a computer medium claim. Thus, arguments similar to that presented above for claim 1 is equally applicable to claim 35. Note, Nakajima discloses computer medium as seen in Figures 2, 8, 17, 22, and 29.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. (US 6,067,367) (hereinafter, "Nakajima") in view of Ito et al. (US 6,754,367) (hereinafter, "Ito").

With regard to claim 3 Nakajima discloses determining correlation function value as disclosed above in claim 1 and the arguments are not repeated herein, but are incorporated by reference. However, Nakajima does not expressly disclose determined value based on at least one correlation function value being a slope. Ito discloses determining a correlation value based on a slope (i.e., standard deviation) at col. 9 lines 15-41. Nakajima and Ito are combinable because they are from the same field of endeavor, i.e., correlating images to detect object. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Ito with Nakajima. The motivation for doing so is to obtain the sharpness of the object to determine the type of the object as suggested by Ito at col. 9 lines 33-41. Therefore, it would have been obvious to combine Ito with Nakajima to obtain the invention as specified in claim 3.

With regard to claim 4 Ito discloses at least one characterizing the regular background portion of the correlation function comprising at least one of an average correlation function value at col. 5 lines 5-16.

With regard to claim 5 Ito discloses the peak portion of the correlation function comprising a positive-going extremum (see the positive raising curve side in figure 9B) and at

least one of the at least one correlation function value is compared to a maximum correlation function value characterizing the background portion (Nakajima: col. 13 lines 44-60).

With regard to claim 6 Ito discloses the peak portion of the correlation function comprising a negative-going extremum (see the negative dropping curve side in figure 9B) and at least one of the at least one correlation function value is compared to a maximum correlation function value characterizing the background portion (Nakajima: col. 13 lines 44-60).

With regard to claim 7 Ito discloses determining a difference between at leas tone pair of correlation function values (i.e., values are obtained from correlating images), and determining if the difference exceeds an established threshold value fro the difference (col. 4 lines 6-21, col. 5 lines 21-37).

5. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. (US 6,067,367) (hereinafter, "Nakajima") in view of Simske et al. (US 6,683,984) (hereinafter, "Simske").

With regard to claims 29-30 Nakajima discloses obtaining images using a CCD camera 10 at col. 12 lines 6-7. However, Nakajima does not expressly disclose obtaining images using an optical device that moves relative to a member having an image surface. Simske discloses obtaining images using an optical device that moves relative to a member having an image surface in Figure 1 (see, col. 2 lines 65 to col. 3 lines 1-18 where a scanner 100 includes an optical assembly 110 for imagining an item on the surface 106. The optical assembly discloses an illumination source 112). Nakajima and Simske are combinable because they are from the same field of endeavor, i.e., correlating images to detect object/background. At the time of the

invention, it would have been obvious to a person of ordinary skill in the art to combine the teaching of Simske with Nakajima. The motivation for doing so is to take advantage of the optical characteristics of the background contrast with the optical characteristics of the pages to be scanned as suggested by Simske at col. 1 lines 40-57. Therefore, it would have been obvious to combine Simske with Nakajima to obtain the invention as specified in claim 29.

Allowable Subject Matter

6. Claim 33 is allowed.

7. The following is an examiner's statement of reasons for allowance:

The instant invention defines a system for image correlation based on displacement. The claimed invention distinguishes over the prior art by the manner in which the system discloses the elements of the system, such as, a readhead, a sensing device, a light detector interface circuit, etc. The claimed combination allows for improving a system for image correlation based on displacement measuring usable to measure displacement relative to a member having an image-determining surface.

Image correlation is conventional in the art. However, the prior art of record fails to teach a readhead comprising; a sensing device that receives light reflected from the image-determining surface, the sensing device comprising a plurality of image elements that are sensitive to the reflected light, the plurality of image elements being spaced apart along at least a first direction, the image elements spaced along the first direction at a predetermined spacing, the predetermined spacing usable to determine the spatial translation of an image on the readhead, the spatial translation of the image on the readhead usable to determine the relative displacement of the readhead and the image-determining surface along a predetermined direction, a light

detector interface circuit connected to the sensing device, the light detector interface circuitry outputting signal values from the image elements of the sensing device, the signal values representative of image intensities of the reflected light on those image elements, and a signal generating and processing circuitry element connected to the light detector interface circuit of the readhead; wherein: the light reflected from the image-determining surface creates an intensity pattern on the plurality of image elements based on the relative position of the image-determining surface and the readhead; the light detector interface circuitry outputs a signal value from at least some of the plurality of image elements, the signal values together comprising an image; the signal generating and processing circuitry element inputs a first image corresponding to a first relative position of the image-determining surface and the readhead and stores a representation of the image; the signal generating and processing circuitry element inputs a second image corresponding to a second relative position of the image-determining surface and the readhead; the signal generating and processing circuitry element, based on the first and second images, obtains correlation function values for at least one of a first set of correlation function value points that are sparsely distributed within a correlation function space of a correlation function having a regular background portion and a peak portion; the signal generating and processing circuitry element analyzes a value of at least one correlation function value point of the first set to identify at least one correlation function value point of the first set of correlation function value points that lies within the peak portion; the signal generating and processing circuitry element, based on the first and second images, obtains correlation function values for at least one of a second set of correlation function value points, the correlation function value points of the second set selected based on at least one of the at least one

correlation function value point of the first set of correlation function value points that lies within the peak portion, the second set of correlation function value points densely distributed within at least a region of the peak portion; and the signal generating and processing circuitry element determines the location of the peak of the correlation function based on at least some of the second set of correlation function value points as disclosed in claim 33.

These elements in combination with all of the other elements of the claims are not taught or fairly suggested in the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Claims 9-10 and 13-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The closest prior art to Nakajima, Ito, Simske are directed to determining a location of a peak of a correlation value by comparing two images as disclosed in an independent claim 1.

However, the closest prior art fails to disclose anything about dynamically determining the at least one value characterizing the regular background portion of the correlation function comprises: auto-correlating at least one representative image to generate at least a representative portion of the regular background portion of the auto-correlation function of that image; and determining, based on at least the representative portion of the regular background portion of that

auto-correlation function, the at least one value characterizing the regular background portion of the correlation function as disclosed in claim 9. The closest prior art also fails to disclose the set of sparsely distributed correlation function value points corresponds to one of a predetermined set of relative offset positions between the first and second images, a predetermined sequence of relative offset positions between the first and second images, a dynamically determined set of relative offset positions between the first and second images, and a dynamically determined sequence of relative offset positions between the first and second images as disclosed in claim 13. Further, the closest prior art fails to disclose comparing the first high-spatial-frequency image to the second high-spatial-frequency image to determine a plurality of additional correlation function values for a further set of densely distributed correlation function value points of the correlation function in the vicinity of the at least one correlation function value point that lies within the peak portion, the further set of correlation function value points densely distributed within at least a region of the peak portion; and determining the location of the peak of the correlation function based on at least some of the additional correlation function value points as disclosed in claim 21. Even further, the closest prior art fails to disclose the comparing step comprises determining a first at least one correlation function value for a set of at least one sparsely distributed correlation function value point in a first iteration, analyzing a first value based on that first member in the first iteration to determine if the corresponding correlation function value point lies within the peak portion; determining if a predetermined halt condition is satisfied; and repeating the comparing and analyzing steps in additional iterations if the predetermined halt condition is not satisfied as disclosed in claim 23.

It is for these reasons in combination with all the other elements of the claim that claims 9, 13, 21, and 23 would be allowable if rewritten in independent form including all of the limitation of the base claim and any intervening claims. Claims 10, 14-20, 22, and 24-26 would be allowable for the same reason as claims 9, 13, 21 and 23.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali D Patel whose telephone number is 703-306-4182. The examiner can normally be reached on M-F 8:00am - 5:00pm (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shefali D Patel
Examiner
Art Unit 2621

November 9, 2004

LEO BOUDREAU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600